



MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards and EU Standards

SECTION 1. PRODUCT IDENTIFICATION

PRODUCT NAME: Ammonium Hydroxide, 3N Solution, Isotopically labeled

PRODUCT USE: Various

MANUFACTURER:

ADDRESS: SPECTRA GASES, INC.
3434 Route 22 West
Branchburg, NJ 08876, U.S.A.

PHONE: 908/252-9300

FAX: 908/252-0811

WEB SITE: www.spectra-gases.com

SPECTRA GASES EMERGENCY CONTACT: 800/932-0624 8:30 am - 7:00 pm (EST)

24 HOUR EMERGENCY CONTACT, CHEMTREC: 800/424-9300, 202/484-7616

SECTION 2. COMPOSITION and INFORMATION ON INGREDIENTS

This MSDS covers three stable isotopes of Ammonium Hydroxide: 15N Ammonium Hydroxide; 2H Ammonium Hydroxide (Ammonium Deuterioxide); and 2H15N Ammonium Hydroxide (Ammonium Deuterioxide). These compounds share the same health hazards as Ammonium Hydroxide and mostly share the same physical properties. Differences are given in Section 9 (Physical and Chemical Properties).

EU LABELING/CLASSIFICATION: This product meets the following definition, per the European Community Council Directives.

EU Classification: [C]: Corrosive; [N]: Dangerous for the environment.

EU Risk Phrases: [R: 34]: Causes burns. [R: 50]: Very toxic to aquatic organisms.

Chemical Name	Chemical Synonym	Chemical Formula	CAS #	EINECS #	% Composition	EU Classification For Components
Ammonium Hydroxide	Ammonia aqueous; Aqua ammonia	H ₃ NO	1336-21-6	215-647-6	10-35%	HAZARD CLASSIFICATION: C [Corrosive]; N [Dangerous for the Environment] RISK PHRASES: R: 34; R: 50
Water	None	H ₂ O	7732-18-5	231-791-2	Balance	HAZARD CLASSIFICATION: Not Applicable RISK PHRASES: Not Applicable

SECTION 3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: Product Description: This product is a colorless to milky-white, corrosive liquid with an ammonia odor. **Health Hazards:** This product is corrosive and can irritate and burn contaminated tissue. In the event of fire or spill, adequate precautions must be taken. **Flammability Hazards:** This product is not flammable. If heated to decomposition, this material will release flammable ammonia gas. **Reactivity Hazards:** This product is not reactive. **Environmental Hazards:** Release of this product to the environment can cause harm to plants and animals or may be fatal. **Emergency Response Considerations:** Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding. **WARNING** - If rescue personnel need to enter an area suspected of having a high level of Ammonium Hydroxide, they should be equipped with Self-Contained Breathing Apparatus (SCBA).

HMIS RATINGS: HEALTH HAZARD: = 3; FLAMMABILITY HAZARD: = 0; PHYSICAL HAZARD: = 0

ROUTES OF ENTRY, SYMPTOMS OF ACUTE EXPOSURE:

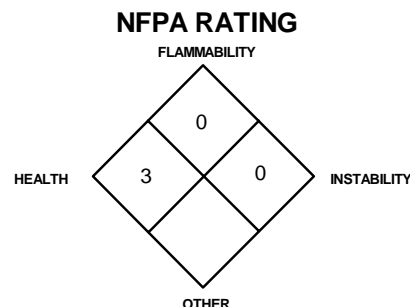
EYE CONTACT: Depending on the duration and concentration of overexposure, eye contact will cause irritation, scarring, tearing, ulceration, and blindness.

INGESTION: Not a likely route of industrial exposure. If this product is swallowed, it will irritate and burn the mouth, throat, esophagus, and other tissues of the digestive system. Symptoms may include pain, vomiting, diarrhea, and collapse. Severe ingestion overexposure may be fatal.

INHALATION: If vapors, mists or sprays of this product are inhaled, irritation and/or burns to the nose, throat, and lung may occur. Symptoms can include coughing, tightness of the chest, and difficulty breathing. Repeated inhalation overexposure may damage the lungs. Inhalation of high concentrations may be fatal. Prolonged or severe inhalation overexposures may cause tissue damage and pulmonary edema (an accumulation of fluid in the lungs), a potentially fatal condition; symptoms may be delayed by hours or days.

SKIN CONTACT: Depending on the duration and concentration of overexposure, skin contact may cause reddening, scarring, chemical burns, and ulceration. Repeated, low level skin overexposures can cause dermatitis (dry, red skin).

OTHER HEALTH EFFECTS: None.

SECTION 3. HAZARD IDENTIFICATION (Continued)**ROUTES OF ENTRY, SYMPTOMS OF CHRONIC EXPOSURE:****ROUTES OF ENTRY:** Inhalation, skin.**TARGET ORGANS:** Respiratory System, Skin.**SYMPTOMS:** Persistent irritation may result from repeated exposure. Repeated inhalation over-exposure can result in emphysema. Repeated skin contact can cause dermatitis.**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Respiratory conditions, skin conditions.**CARCINOGENICITY:** Ammonium Hydroxide is not listed as a carcinogen or as a potential carcinogen on EPA, NIOSH, GERMAN MAK, ACGIH, OSHA, NTP, IARC, or CAL/OSHA Carcinogenicity lists.**SECTION 4. FIRST AID MEASURES****EYE CONTACT:** In case of contact, gently flush victim's eyes with water for minimum of 15 minutes. Administer anesthetic eye drops after one minute of flushing if victim suffers from spasms to the eyes, in order to facilitate irrigation.**INGESTION:** Not a likely route of industrial exposure. If accidentally ingested, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If victim is convulsing, maintain an open airway and obtain immediate medical attention.**INHALATION:** Remove victim(s) to fresh air, as quickly as possible. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. For severe, immediate effects or delayed symptoms seek appropriate medical attention.**SKIN CONTACT:** In case of skin contact, immediately flush area of exposure with water for minimum of 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim should seek appropriate medical attention if symptoms persist.**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate exposure.**SECTION 5. FIRE FIGHTING MEASURES****FLASH POINT:** Not Applicable**AUTOIGNITION:** Not Applicable**FLAMMABLE RANGE:** Not Applicable**NFPA RATINGS:**HEALTH: = 3 FLAMMABILITY: = 0
INSTABILITY: = 0 SPECIAL: None**EXTINGUISHING MEDIA:** This is a non-flammable liquid; use fire-extinguishing media appropriate for the surrounding materials.**SPECIAL FIRE-FIGHTING PROCEDURES:** If heated to decomposition, this material can decompose to form flammable ammonia gas. This material is corrosive and presents a contact hazard to fire-fighters.**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Containers of this product may rupture in the heat of fire.**EXPLOSION SENSITIVITY TO MECHANICAL IMPACT:** Not sensitive.**EXPLOSION SENSITIVITY TO STATIC DISCHARGE:** Not sensitive.**HAZARDOUS COMBUSTION PRODUCTS:** This material will produce toxic combustion products including ammonia and nitrogen oxides.**SECTION 6. ACCIDENTAL RELEASE MEASURES****STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:** Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. Monitor the area for vapors of Ammonia. Levels of Ammonium Hydroxide should be below applicable exposure levels listed in Section 8 (Exposure Controls/Personal Protection) before personnel can be allowed in the area without SCBA.For small releases, clean-up spilled liquid wearing gloves, goggles, faceshield, and suitable body protection. The minimum Personal Protective Equipment recommended for response to non-incident releases should be **Level B: triple-gloves (neoprene gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard-hat, and Self-Contained Breathing Apparatus**. Absorb spilled liquid with polypads or other suitable absorbent materials. Neutralize residue with citric acid or other neutralizing agent for basic materials. Decontaminate the area thoroughly. Test area with litmus paper to ensure neutralization. Place all spill residue in a suitable container. Dispose of in accordance with applicable U.S. Federal, State, or local procedures, or appropriate Canadian standards and those of Member States of the European Union [EU] (see Section 13, Disposal Considerations).

SECTION 7. HANDLING AND STORAGE

WORK AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors or mists generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE: All employees who handle this material should be trained to handle it safely. Keep container tightly closed when not in use. If this product is transferred into another container, only use portable containers and dispensing equipment (faucet, pump, drip can) approved for corrosive, basic liquids. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or freezing temperatures. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Special storage considerations should be made if storing large quantities. Empty containers may contain residual liquid or vapors which are corrosive; therefore, empty containers should be handled with care.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Forced ventilation systems for the general work area should be provided. Employee exposure should be monitored and reduced to the lowest practical levels using ventilation or other appropriate engineering controls. Ensure eyewash/safety shower stations are available near areas where this product is used.

EXPOSURE LIMITS:

Chemical Name	CAS #	OSHA PELs ppm	ACGIH TLVs ppm	NIOSH RELs ppm	NIOSH IDLH ppm	DFG MAKs ppm	AIHA WEELs ppm
Ammonium Hydroxide (exposure limits are for Ammonia, CAS# 7664-41-7)	1336-21-6	TWA = 50 (STEL = 35 was vacated 1989)	TWA = 25 STEL = 35	TWA = 25 STEL = 35	300	TWA = 20 PEAK = 2•MAK 15 min. average value, 1-hr interval	NE

NE = Not Established

RESPIRATORY PROTECTION: Use positive pressure supplied air respiratory protection if Ammonia levels exceed exposure limits, or during emergency response to a release of this product. If respiratory protection is required, follow the requirements of the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), standards of Canada, the European Standard EN149, and EC member states.

EYE PROTECTION: Use approved safety glasses. Eyewear should be as described in OSHA 29 CFR 1910.133 or by the European Standard EN166.

SKIN PROTECTION: Use rubber, neoprene, or polyvinyl chloride gloves or other appropriate glove, as described in OSHA 29 CFR 1910.138, and the European Standard DIN EN 374 and Standards of Canada for further information. Use appropriate gloves for spill response.

OTHER PROTECTIVE EQUIPMENT: Use body protection appropriate for task. An apron or other impermeable body protection is suggested. Full-body chemical protective clothing is recommended for emergency response procedures.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

VAPOR DENSITY (air = 1): Not available.

VAPOR PRESSURE @ 20°C: ≈15 kPa (112.5 mm Hg)

BOILING POINT (29.4%): 27.2°C (81°F)

FREEZING/MELTING POINT: -72-77°C (-98-107°F)

SPECIFIC GRAVITY 10% Solution (water = 1): 0.96

pH: Alkaline (product)

SOLUBILITY IN WATER: Completely soluble.

MOLECULAR WEIGHT: 35.05

EVAPORATION RATE (n-BuAc = 1): Similar to water.

EXPANSION RATIO: Not applicable.

PERCENT VOLATILE BY VOLUME: Not known.

DISSOCIATION CONSTANTS: Not established.

ODOR THRESHOLD: 0.043-53 ppm

APPEARANCE, ODOR AND COLOR: Colorless to milky-white liquid with an ammonia odor.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES (Continued)

The following information is for 15N Ammonium Hydroxide:

SPECIFIC GRAVITY (water = 1): 0.965

MOLECULAR WEIGHT: 36.05

The following information is for 2H Ammonium Hydroxide:

SPECIFIC GRAVITY (water = 1): 1.056

MOLECULAR WEIGHT: 40.05

The following information is for 2H15N Ammonium Hydroxide:

SPECIFIC GRAVITY (water = 1): 1.082

MOLECULAR WEIGHT: 41.05

SECTION 10. STABILITY AND REACTIVITY

STABILITY: Stable at standard temperatures and pressures. Can evolve ammonia gas at under standard conditions.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product would be incompatible with strong organic, inorganic acids, acrolein, dimethyl sulfate, halogens, fluorine, iodine, nitromethane, oleum, beta-propiolactone, propylene oxide, silver compounds including nitrate, oxide and permanganate, and lead and zinc salts. Ammonium Hydroxide is corrosive to aluminum, copper, lead, nickel, silver, tin, zinc, various alloys of these metals and galvanized surfaces.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with or exposure to incompatible materials and water reactive materials.

REACTIVITY:

A) HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition of this product can generate nitrogen oxides and ammonia.

B) HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION**TOXICITY DATA:****AMMONIUM HYDROXIDE:**

Mutation in Microorganisms (*Escherichia coli*) = 10 mg/disc

Standard Draize Test (eye, rabbit) = 250 µg; Severe

Standard Draize Test (eye, rabbit) = 44,250 µg; Severe

Eye Irritancy (rabbit) = 1 mg/30 seconds/rinsed with water; Severe

AMMONIUM HYDROXIDE (continued):

TCLo (inhalation, human) = 408 ppm; Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis), acute pulmonary edema

LCLo (inhalation, human) = 5000 ppm

LDLo (oral, human) = 43 mg/kg

LD₅₀ (oral, rat) = 350 mg/kg; Gastrointestinal: other changes; Liver: other changes; Kidney, Ureter, Bladder: other changes

AMMONIUM HYDROXIDE (continued):

LD₅₀ (intravenous, mouse) = 91 mg/kg; Behavioral: convulsions or effect on seizure threshold, coma; Lungs, Thorax, or Respiration: respiratory stimulation

LDLo (subcutaneous, mouse) = 160 mg/kg

LDLo (oral, cat) = 750 mg/kg

LDLo (subcutaneous, rabbit) = 200 mg/kg

LDLo (intravenous, rabbit) = 10 mg/kg

LDLo (parenteral, frog) = 2500 mg/kg

CARCINOGENICITY: Ammonium Hydroxide has not been found to be carcinogenic.

IRRITANCY OF PRODUCT: Ammonium Hydroxide is moderately to severely irritating, depending on concentration and duration of exposure.

SENSITIZATION OF PRODUCT: Ammonium Hydroxide is not known to be a human skin or respiratory sensitizer.

REPRODUCTIVE TOXICITY INFORMATION:

Mutagenicity: Ammonium Hydroxide is not reported to cause mutagenic effects in humans.

Embryotoxicity: Ammonium Hydroxide is not reported to cause embryotoxic effects in humans.

Teratogenicity: Ammonium Hydroxide is not reported to cause teratogenic effects in humans.

Reproductive Toxicity: Ammonium Hydroxide is not reported to cause adverse reproductive effects in humans.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, there are no Biological Exposure Indices (BEIs) determined for Ammonium Hydroxide.

SECTION 12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This product will be degraded over time into other compounds. The following environmental data are available for the components of this product:

AMMONIUM HYDROXIDE:

Persistence: Natural CO₂ will slowly neutralize ammonia compounds. Food Chain Concentration Potential: Negative

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product may be harmful or fatal to contaminated plant and animal-life (especially if large quantities of are released).

SECTION 12. ECOLOGICAL INFORMATION (Continued)

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product may be harmful or fatal to contaminated aquatic plant and animal life. The following aquatic toxicity data are available for Ammonium Hydroxide.

AMMONIUM HYDROXIDE:

TLm (diatom) 120 hours = 420 mg/L/ hard water and soft water/ 22°C; 50% growth reduction

TLm (bluegill) 96 hours = 3.4 mg/L/ hard water/ 20°C

TLm (goldfish) 24-96 hours = 2-2.5 mg/L

TLm (snail) 96 hours = 90 mg/L (soft water, 20°C) (conditions of bioassay not specified)

TLm (striped bass) 96 hours = 0.97 mg/L (15°C)

TLm (striped bass) 96 hours = 0.73 mg/L (23°C) (un-ionized NH₃) (conditions of bioassay not specified)

TLm (stickleback) 96 hours = 5.05 mg/L (15°C)

TLm (stickleback) 96 hours = 1.12 mg/L (23°C) (Unionized NH₃) (conditions of bioassay not specified)

TLm (fathead minnow) 96 hours = 8.2 mg/L/ hard water

LC₅₀ (*Lepomis macrochirus*, bluegill) 48 hours = 0.024-0.093 mg/L

LC₅₀ (*Ictalurus punctatus*, channel catfish) 1 week = 0.974 mg/L/ pH 7.7/ 21.1°C

LC₅₀ (*Ictalurus punctatus*, channel catfish) 1 week = 1.27 mg/L/ pH 7.8/ 21.7°C

LC₅₀ (*Ictalurus punctatus*, channel catfish) 1 week = 1.41 mg/L/ pH 7.8/ 22.8°C

LC₅₀ (*Ictalurus punctatus*, channel catfish) 1 week = 1.97 mg/L/ pH 8.0/ 22.8°C

LC₅₀ (Atlantic salmon smelt) 24 hours = 5-8 mg/L

AMMONIUM HYDROXIDE (continued):

LC₅₀ (perch) = 0.29 mg/L/ 7 days/ un-ionized NH₃

LC₅₀ (*Daphnia magna*) 48 hours = 0.66 mg/L/ 22°C

LC₅₀ (*Salmo gairdneri*) 24 hours = 8 mg/mL NH₃

LC₅₀ (Coho salmon) 96 hours = 0.45 mg/L

LC₅₀ (guppy, fry) 72 hours = 74 mg/L

LC₅₀ (*Salmo clarki*, cutthroat trout fry) 96 hours = 0.5-0.8 mg/L

LC₅₀ (*Salmo clarki*, cutthroat trout fry) 36 days = 0.56 mg/L

LC₅₀ (rainbow trout, fertilized egg) 24 hours = >3.58 mg/L

LC₅₀ (rainbow trout, alevin 0-50 days old) 24 hours = > 3.58 mg/L

LC₅₀ (rainbow trout, fry 85 days old) 24 hours = 0.068 mg/L

LC₅₀ (rainbow trout, adult) 24 hours = 0.097 mg/L

LC₅₀ (walking catfish) 48 hours = 0.28 mg/L

LC₅₀ (Atlantic salmon smelt) 24 hours = 0.02-0.08 mg/L NH₃/ freshwater

LC₅₀ (*Oncorhynchus tshawytscha*, Chinook salmon) 24 hours = 0.36 mg/L NH₃/ freshwater

LC₅₀ (*Oncorhynchus tshawytscha*, Chinook salmon) 24 hours = 2.2 mg of NH₃/L/ 9.6% salinity

LC₅₀ (*nauplius*) = 3.58 mg/L NH₃/ 24 hours/ total NH₃; 0.29 mg/L NH₃-N/ un-ionized

LC₅₀ (*mysis*) = 46.01 mg/L NH₃-N/ 24 hours/ total NH₃; 3.17 mg/L NH₃-N/ un-ionized

LC₅₀ (green sunfish) = 0.50 mg/L NH₃/ pH 6.6; 1.06 mg/L NH₃/ pH 7.2; 1.34 mg/L NH₃/ pH 7.7; 1.73 mg/L NH₃/ pH 8.7

LC₅₀ (*Rutilus rutilus*, roach) 24 hours = 0.42 mg/L/ un-ionized NH₃

MOBILITY: Ammonium Hydroxide is highly mobile in soil.

PERSISTENCE AND BIODEGRADABILITY: Ammonium Hydroxide will readily biodegrade.

POTENTIAL TO BIOACCUMULATE: Ammonium Hydroxide will not bioaccumulate.

OZONE-DEPLETION POTENTIAL: Ammonium Hydroxide is not a Class I or Class II ozone depleting chemical (40 CFR Part 82).

SECTION 13. DISPOSAL CONSIDERATIONS

Residual product can be neutralized using various caustic systems (e.g., activated alumina or soda lime). Disposal shall be done in accordance with U.S. Federal, State and local regulations, regulations of the provinces of Canada or EU member states.

SECTION 14. TRANSPORT INFORMATION**U.S. DOT SHIPPING INFORMATION:**

UN IDENTIFICATION NUMBER:	UN 2672
PROPER SHIPPING NAME:	Ammonia solution
HAZARD CLASS NUMBER and DESCRIPTION:	8 (Corrosive)
PACKING GROUP:	III
SHIPPING LABEL(S) REQUIRED:	Class 8 (Corrosive)
PLACARD (When required):	Class 8 (Corrosive)
NAERG (NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK) #:	154

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This material is considered as Dangerous Goods, per regulations of Transport Canada. The use of the above U.S. DOT information from the U.S. 49 CFR regulations is allowed for shipments that originate in the U.S. For shipments via ground vehicle or rail that originate in Canada, the following information is applicable.

UN IDENTIFICATION NUMBER:	UN 2672
PROPER SHIPPING NAME:	Ammonia solution
HAZARD CLASS NUMBER and DESCRIPTION:	8 (Corrosive)
PACKING GROUP:	III
HAZARD SHIPPING LABEL(S) REQUIRED:	Class 8 (Corrosive)
SPECIAL PROVISIONS:	None
EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX:	5
ERAP INDEX:	None
PASSENGER CARRYING SHIP INDEX:	None
PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX:	5

SECTION 14. TRANSPORT INFORMATION (Continued)

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This material is considered as dangerous goods, per the International Air Transport Association.

UN IDENTIFICATION NUMBER: UN 2672
PROPER SHIPPING NAME: Ammonia solution
HAZARD CLASS NUMBER and DESCRIPTION: 8 (Corrosive)
PACKING GROUP: III
HAZARD SHIPPING LABEL(S) REQUIRED: Class 8 (Corrosive)
PASSENGER and CARGO AIRCRAFT PACKING INSTRUCTION: 819
PASSENGER and CARGO AIRCRAFT MAXIMUM NET QUANTITY PER PKG: 5 L
PASSENGER and CARGO AIRCRAFT LIMITED QUANTITY PACKING INSTRUCTION: Y819
PASSENGER and CARGO AIRCRAFT LIMITED QUANTITY MAXIMUM NET QUANTITY PER PKG: 1 L
CARGO AIRCRAFT ONLY PACKING INSTRUCTION: 813
CARGO AIRCRAFT ONLY MAXIMUM NET QUANTITY PER PKG: 60 L
SPECIAL PROVISIONS: A64
ERG CODE: 8L

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This material is considered as dangerous goods, per the International Maritime Organization.

UN IDENTIFICATION NUMBER: UN 2672
PROPER SHIPPING NAME: Ammonia solution
HAZARD CLASS NUMBER and DESCRIPTION: 8 (Corrosive)
PACKING GROUP: III
HAZARD SHIPPING LABEL(S) REQUIRED: Class 8 (Corrosive)
SPECIAL PROVISIONS: None
LIMITED QUANTITIES: 5 L
PACKING INSTRUCTIONS: P001, LP01
EmS: F-A, S-B
STOWAGE CATEGORY: Category A. Under deck in mechanically ventilated space. Clear of living quarters. "Separated from" acids.

MARINE POLLUTANT: The components of this material are not designated by the IMO to be Marine Pollutants.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This material is considered to be dangerous goods by the Economic Commission for Europe. The following additional information specific to Europe is provided.

UN IDENTIFICATION NUMBER: UN 2672
NAME and DESCRIPTION: Ammonia solution
CLASS: 8
CLASSIFICATION CODE: C5
PACKING GROUP: III
LABELS: 8
SPECIAL PROVISIONS: 543
LIMITED QUANTITIES: LQ19
PACKING INSTRUCTIONS: P001, IBC03, LP01, R001
MIXED PACKING PROVISIONS: MP15
HAZARD IDENTIFICATION No.: 80

SECTION 15. REGULATORY INFORMATION**U.S. FEDERAL REGULATIONS:****EPA - ENVIRONMENTAL PROTECTION AGENCY:**

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (40 CFR Parts 117 and 302)

Reportable Quantity (RQ): Ammonium Hydroxide = 1000 lb. (454 kg)

SARA TITLE III: Superfund Amendment and Reauthorization Act

SECTIONS 302/304: Emergency Planning and Notification (40 CFR Part 355)

Extremely Hazardous Substances: Ammonium Hydroxide is not listed.

Threshold Planning Quantity (TPQ): Not applicable.

Reportable Quantity (RQ): Not applicable.

SECTIONS 311/312: Hazardous Chemical Reporting (40 CFR Part 370)

IMMEDIATE HEALTH: Yes

PRESSURE: No

DELAYED HEALTH: Yes

REACTIVITY: No

FIRE: No

SECTION 15. REGULATORY INFORMATION (Continued)**U.S. FEDERAL REGULATIONS (continued):****EPA - ENVIRONMENTAL PROTECTION AGENCY (continued):****SECTION 313:** Toxic Chemical Release Reporting (40 CFR 372)

Releases of Ammonium Hydroxide require reporting under Section 313.

CLEAN AIR ACT:**SECTION 112 (r):** Risk Management Programs for Chemical Accidental Release
(40 CFR Part 68)

Threshold Planning Quantity (TPQ): Not applicable.

TSCA: Toxic Substances Control Act

Ammonium Hydroxide is listed on the TSCA Inventory.

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:**29 CFR Part 1910.119:** Process Safety Management of Highly Hazardous Chemicals.

Threshold Planning Quantity (TPQ): Not applicable.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this material is a listed substance which the State of California requires warning under this statute.**CANADIAN FEDERAL REGULATIONS:****CANADIAN DSL INVENTORY STATUS:** Ammonium Hydroxide is listed on the Canadian DSL Inventory.**OTHER CANADIAN REGULATIONS:** This material would be categorized as a Controlled Product, Hazard Classes A, and D2, as per the Controlled Product Regulations. Ammonium Hydroxide is not on the CEPA Priorities Substances Lists.**CANADIAN WHMIS CLASSIFICATION and SYMBOLS:****Class D1B:** Toxic Material/Immediate and Serious Effects**Class E:** Corrosive Material**EUROPEAN ECONOMIC COMMUNITY REGULATIONS:****EC LABELING AND CLASSIFICATION:** This product meets the following definition, per the European Community Council Directive 67/548/EEC.**EU Classification:**

[C]: Corrosive; [N]: Dangerous for the environment.

EU Risk Phrases:

[R: 34]: Causes burns. [R: 50]: Very toxic to aquatic organisms.

EU Safety Phrases:

[S: 1/2-]: Keep locked up and out of reach of children. *This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only. [S: 26]: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. [S: 36/37/39]: Wear suitable protective clothing, gloves and eye/face protection. [S: 45]: In case of accident or if you feel unwell, seek medical advice immediately (show label where possible). [S: 61]: Avoid release to the environment. Refer to special instructions/safety data sheet.

EU Comments:

The product label must indicate the percentage concentration of the solution.

CONCENTRATION GREATER THAN OR EQUAL TO 25%: [C]: Corrosive; [N]: Dangerous for the environment. [R:34]: Causes burns. [R: 50]: Very toxic to aquatic organisms.

CONCENTRATION GREATER THAN OR EQUAL TO 10% AND LESS THAN 25%: [C]: Corrosive; [R: 34]: Causes burns.

CONCENTRATION GREATER THAN OR EQUAL TO 5% AND LESS THAN 10%: [Xi]: Irritant; [R: 36/37/38]: Irritating to eyes, respiratory system and skin.

EUROPEAN UNION ANNEX II HAZARD SYMBOLS:

SECTION 16. OTHER INFORMATION

Information contained in this Material Safety Data Sheet is provided to our customers so they may comply with 29 CFR 1910.1200, Hazard Communication Standard, the Canadian WHMIS Standard, and the requirements of the European Community Directives. The intent of this Material Safety Data Sheet is to provide end users of this product with the health and physical hazards associated with possible exposure to this product. All statements, technical data and recommendations are based on readily available texts and data that Spectra Gases, Inc., believes to be reliable and accurate. Spectra Gases, Inc., makes no warranties, guarantees or representations of any kind with respect to this product or this data. It is the responsibility of the user to obtain and use the most recent version of this MSDS.

For Definition of Terms used in Spectra MSDSs see Spectra Gases, Inc. website: www.spectra-gases.com. Or contact your Customer Service Representative.

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
800/441-3365
